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Amendment to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. – 15. (Canceled)

16.   (Previously Presented) A method for generating a shadow map, the method comprising:

receiving information associated with a first light source;

generating at least a first ray and a second ray from the first light source;

determining a first ray transmittance function associated with the first ray;

determining a second ray transmittance function associated with the second ray;

processing information associated with the first ray transmittance function and the second ray transmittance function;

determining a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

wherein the determining a first ray transmittance function includes:

processing information associated with the first ray;

determining at least a first surface transmittance function based on at least information associated with the first ray;

determining at least a first volume transmittance function based on at least information associated with the first ray;

processing information associated with the first surface transmittance function and the first volume transmittance function;

determining the first ray transmittance function based on at least information associated with the first surface transmittance function and the first volume transmittance function.

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17.   (Previously Presented) The method of claim 16 wherein the determining at least a first volume transmittance function comprises:

processing information associated with the first ray;

determining a first volumetric element intersecting the first ray;

processing information associated with the first volumetric element;

determining the first volume transmittance function based on at least information associated with the first volumetric element.

18.   (Previously Presented) The method of claim 16 wherein the determining at least a first surface transmittance function comprises:

processing information associated with the first ray;

determining a first surface element intersecting the first ray;

processing information associated with the first surface element;

determining the first surface transmittance function based on at least information associated with the first surface element.

19.   (Previously Presented) The method of claim 16, and further comprising:

compressing the first visibility function to generate a second visibility function;

storing the second visibility function in a shadow map.

20.   (Previously Presented) The method of claim 19 wherein a first difference between the first visibility function and the second visibility function is larger than or equal to a first predetermined value and smaller than or equal to a second predetermined value.

21.   (Previously Presented) The method of claim 19 wherein the shadow map includes the second visibility function with respect to a first three-dimensional coordinate system, the first three-dimensional coordinate system associated with the first light source.

22.   (Previously Presented) The method of claim 16 wherein the first visibility function is capable of being equal to any value smaller than or equal to a first value and larger

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than or equal to a second value, the first value associated with being fully lit by the first light source, and the second value associated with being completely unlit by the first light source.

23.   (Previously Presented) The method of claim 16, and further comprising:

determining a first map plane associated with the first light source;

processing information associated with the first map plane;

determining a first sample region on the first map plane;

wherein each of the first ray and the second ray intersects the first map plane within the first sample region.

24.   (Previously Presented) The method of claim 16 wherein the first visibility function is associated with a plurality of values corresponding to a first location with respect to a first three-dimensional coordinate system, the first three-dimensional system associated with the first light source.

25.   (Previously Presented) The method of claim 24 wherein the plurality of values are associated with a plurality of colors respectively.

26.   (Previously Presented) The method of claim 16 wherein the first light source is an area light source.

27.   (Previously Presented) The method of claim 16 wherein the first light source is a point light source.

28.   (Previously Presented) A method for generating a shadow map, the method comprising:

receiving information associated with a first light source;

generating at least a first ray and a second ray from the first light source;

determining a first ray transmittance function associated with the first ray;

determining a second ray transmittance function associated with the second ray;

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processing information associated with the first ray transmittance function and the second ray transmittance function;

determining a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

wherein the determining a first ray transmittance function includes:

determining a first geometric element intersecting the first ray;

processing information associated with the first geometric element;

determining a first geometric transmittance function based on at least information associated with the first geometric element;

processing information associated with first geometric transmittance function;

determining the first ray transmittance function based on at least information associated with first geometric transmittance function.

29.   (Previously Presented) The method of claim 28 wherein the first geometric element is a surface element.

30.   (Previously Presented) The method of claim 28 wherein the first geometric element is a volumetric element.

31.   (Previously Presented) A method for generating a shadow map, the method comprising:

receiving information associated with a first light source;

generating at least a first ray and a second ray from the first light source;

determining a first ray transmittance function associated with the first ray;

determining a second ray transmittance function associated with the second ray;

processing information associated with the first ray transmittance function and the second ray transmittance function;

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determining a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

wherein the first visibility function is capable of being equal to any value smaller than or equal to a first value and larger than or equal to a second value, the first value associated with being fully lit by the first light source, and the second value associated with being completely unlit by the first light source.

32.   (Previously Presented) The method of claim 31 wherein the determining a first ray transmittance function associated with the first ray comprises:

processing information associated with the first ray;

determining a first geometric element intersecting the first ray;

processing information associated with the first geometric element;

determining the first geometric transmittance function based on at least information associated with the first geometric element.

33.   (Previously Presented) The method of claim 31, and further comprising:

compressing the first visibility function to generate a second visibility function;

storing the second visibility function in a shadow map.

34.   (Previously Presented) The method of claim 33 wherein a first difference between the first visibility function and the second visibility function is larger than or equal to a first predetermined value and smaller than or equal to a second predetermined value.

35.   (Previously Presented) The method of claim 33 wherein the shadow map includes the second visibility function with respect to a first three-dimensional coordinate system, the first three-dimensional system associated with the first light source.

36.   (Previously Presented) The method of claim 31 wherein the determining a first ray transmittance function associated with the first ray comprises determining ray attenuation associated with at least a first geometric element.

37.   (Previously Presented) The method of claim 36 wherein the first geometric element is a surface element.

38.   (Previously Presented) The method of claim 36 wherein the first geometric element is a volumetric element.

39.   (Previously Presented) The method of claim 31, and further comprising:

determining a first map plane associated with the first light source;

processing information associated with the first map plane;

determining a first sample region on the first map plane;

wherein each of the first ray and the second ray intersects the first map plane within the first sample region.

40.   (Previously Presented) The method of claim 31 wherein the first visibility function is associated with a plurality of values corresponding to a first location with respect to a first three-dimensional coordinate system, the first three-dimensional coordinate system associated with the first light source.

41.   (Previously Presented) The method of claim 40 wherein the plurality of values are associated with a plurality of colors respectively.

42.   (Previously Presented) The method of claim 31 wherein the first light source is an area light source.

43.   (Previously Presented) The method of claim 31 wherein the first light source is a point light source.

44.   (Previously Presented) A method for rendering an object, the method comprising:

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receiving information associated with a first shadow map related to a first light source, the first shadow map including a first visibility function with respect to a first three-dimensional coordinate system;

receiving information associated with a first surface;

determining a first location associated with the first surface with respect to the first three-dimensional coordinate system;

processing information associated with the first location and the first shadow map;

determining a first visibility value associated with the first location based on at least information associated with the first shadow map and the first location;

wherein the first visibility value is capable of being equal to any value smaller than or equal to a first value and larger than or equal to a second value, the first value being associated with being fully lit by the first light source, and second value being associated with being completely unlit by the first light source.

45. (Previously Presented) The image formed according to the method of claim 44.

46. (Previously Presented) A method for rendering an object, the method comprising:

receiving information associated with a first shadow map related to a first light source, the first shadow map including a first visibility function with respect to a first three-dimensional coordinate system;

receiving information associated with a first surface;

determining a first location associated with the first surface with respect to the first three-dimensional coordinate system;

processing information associated with the first location and the first shadow map;

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determining a first visibility value associated with the first location based on at least information associated with the first shadow map and the first location;

wherein the first visibility value is associated with at least a first geometric transmittance function.

47.   (Previously Presented) The image formed according to the method of claim 46.

48.   (Previously Presented) A computer program product including a computer-readable medium including instructions for generating a shadow map, the computer-readable medium comprising:

one or more instructions for receiving information associated with a first light source;

one or more instructions for generating at least a first ray and a second ray from the first light source;

one or more instructions for determining a first ray transmittance function associated with the first ray;

one or more instructions for determining a second ray transmittance function associated with the second ray;

one or more instructions for processing information associated with the first ray transmittance function and the second ray transmittance function;

one or more instructions for determining a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

wherein the one or more instructions for determining a first ray transmittance function includes:

one or more instructions for processing information associated with the first ray;

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one or more instructions for determining at least a first surface transmittance function based on at least information associated with the first ray;

one or more instructions for determining at least a first volume transmittance function based on at least information associated with the first ray;

one or more instructions for processing information associated with the first surface transmittance function and the first volume transmittance function;

one or more instructions for determining the first ray transmittance function based on at least information associated with the first surface transmittance function and the first volume transmittance function.

49.   (Previously Presented) A computer program product including a computer-readable medium including instructions for generating a shadow map, the computer-readable medium comprising:

one or more instructions for receiving information associated with a first light source;

one or more instructions for generating at least a first ray and a second ray from the first light source;

one or more instructions for determining a first ray transmittance function associated with the first ray;

one or more instructions for determining a second ray transmittance function associated with the second ray;

one or more instructions for processing information associated with the first ray transmittance function and the second ray transmittance function;

one or more instructions for determining a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

wherein the one or more instructions for determining a first ray transmittance function includes:

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one or more instructions for determining a first geometric element intersecting the first ray;

one or more instructions for processing information associated with the first geometric element;

one or more instructions for determining a first geometric transmittance function based on at least information associated with the first geometric element;

one or more instructions for processing information associated with first geometric transmittance function;

one or more instructions for determining the first ray transmittance function based on at least information associated with first geometric transmittance function.

50.   (Previously Presented) A computer program product including a computer-readable medium including instructions for generating a shadow map, the computer-readable medium comprising:

one or more instructions for receiving information associated with a first light source;

one or more instructions for generating at least a first ray and a second ray from the first light source;

one or more instructions for determining a first ray transmittance function associated with the first ray;

one or more instructions for determining a second ray transmittance function associated with the second ray;

one or more instructions for processing information associated with the first ray transmittance function and the second ray transmittance function;

one or more instructions for determining a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

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wherein the first visibility function is capable of being equal to any value smaller than or equal to a first value and larger than or equal to a second value, the first value associated with being fully lit by the first light source, and the second value associated with being completely unlit by the first light source.

51. (Previously Presented) A computer program product including a computer-readable medium including instructions for rendering an object, the computer-readable medium comprising:

one or more instructions for receiving information associated with a first shadow map related to a first light source, the first shadow map including a first visibility function with respect to a first three-dimensional coordinate system;

one or more instructions for receiving information associated with a first surface;

one or more instructions for determining a first location associated with the first surface with respect to the first three-dimensional coordinate system;

one or more instructions for processing information associated with the first location and the first shadow map;

one or more instructions for determining a first visibility value associated with the first location based on at least information associated with the first shadow map and the first location;

wherein the first visibility value is capable of being equal to any value smaller than or equal to a first value and larger than or equal to a second value, the first value being associated with being fully lit by the first light source, and second value being associated with being completely unlit by the first light source.

52. (Previously Presented) A computer program product including a computer-readable medium including instructions for rendering an object, the computer-readable medium comprising:

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one or more instructions for receiving information associated with a first shadow map related to a first light source, the first shadow map including a first visibility function with respect to a first three-dimensional coordinate system;

one or more instructions for receiving information associated with a first surface;

one or more instructions for determining a first location associated with the first surface with respect to the first three-dimensional coordinate system;

one or more instructions for processing information associated with the first location and the first shadow map;

one or more instructions for determining a first visibility value associated with the first location based on at least information associated with the first shadow map and the first location;

wherein the first visibility value is associated with at least a first geometric transmittance function.

53.   (Previously Presented) A system for generating a shadow map, the system comprising:

a processing system configured to:

receive information associated with a first light source;

generate at least a first ray and a second ray from the first light source;

determine a first ray transmittance function associated with the first ray;

determine a second ray transmittance function associated with the second ray;

process information associated with the first ray transmittance function and the second ray transmittance function;

determine a first visibility function based on at least information associated with the first ray transmittance function and the second ray transmittance function;

wherein the determine a first ray transmittance function includes:

process information associated with the first ray;

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determine at least a first surface transmittance function based on at
least information associated with the first ray;

determine at least a first volume transmittance function based on at
least information associated with the first ray;

process information associated with the first surface transmittance
function and the first volume transmittance function;

determine the first ray transmittance function based on at least
information associated with the first surface transmittance function and the first
volume transmittance function.

54.   (Previously Presented) A system for generating a shadow map, the system
comprising:

a processing system configured to:

receive information associated with a first light source;

generate at least a first ray and a second ray from the first light source;

determine a first ray transmittance function associated with the first ray;

determine a second ray transmittance function associated with the second
ray;

process information associated with the first ray transmittance function
and the second ray transmittance function;

determine a first visibility function based on at least information
associated with the first ray transmittance function and the second ray transmittance
function;

wherein the determine a first ray transmittance function includes:

determine a first geometric element intersecting the first ray;

process information associated with the first geometric element;

determine a first geometric transmittance function based on at least
information associated with the first geometric element;

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process information associated with first geometric transmittance

function;

determine the first ray transmittance function based on at least

information associated with first geometric transmittance function.

55. (Previously Presented) A system for generating a shadow map, the system

comprising:

a processing system configured to:

receive information associated with a first light source;

generate at least a first ray and a second ray from the first light source;

determine a first ray transmittance function associated with the first ray;

determine a second ray transmittance function associated with the second

ray;

process information associated with the first ray transmittance function

and the second ray transmittance function;

determine a first visibility function based on at least information

associated with the first ray transmittance function and the second ray transmittance

function;

wherein the first visibility function is capable of being equal to any value

smaller than or equal to a first value and larger than or equal to a second value, the first

value associated with being fully lit by the first light source, and the second value

associated with being completely unlit by the first light source.

56. (Previously Presented) A system for rendering an object, the system

comprising:

a processing system configured to:

receive information associated with a first shadow map related to a first

light source, the first shadow map including a first visibility function with respect to a

first three-dimensional coordinate system;

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receive information associated with a first surface;

determine a first location associated with the first surface with respect to the first three-dimensional coordinate system;

process information associated with the first location and the first shadow map;

determine a first visibility value associated with the first location based on at least information associated with the first shadow map and the first location;

wherein the first visibility value is capable of being equal to any value smaller than or equal to a first value and larger than or equal to a second value, the first value being associated with being fully lit by the first light source, and second value being associated with being completely unlit by the first light source.

57.   (Previously Presented) A system for rendering an object, the system comprising:

a processing system configured to:

receive information associated with a first shadow map related to a first light source, the first shadow map including a first visibility function with respect to a first three-dimensional coordinate system;

receive information associated with a first surface;

determine a first location associated with the first surface with respect to the first three-dimensional coordinate system;

process information associated with the first location and the first shadow map;

determine a first visibility value associated with the first location based on at least information associated with the first shadow map and the first location;

wherein the first visibility value is associated with at least a first geometric transmittance function.

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58.   (Previously Presented) The computer-readable medium of claim 48, and further comprising:

one or more instructions for compressing the first visibility function to generate a second visibility function;

one or more instructions for storing the second visibility function in a shadow map.

59.   (Previously Presented) The computer-readable medium of claim 48, and further comprising:

one or more instructions for determining a first map plane associated with the first light source;

one or more instructions for processing information associated with the first map plane;

one or more instructions for determining a first sample region on the first map plane;

wherein each of the first ray and the second ray intersects the first map plane within the first sample region.

60.   (Previously Presented) The computer-readable medium of claim 48 wherein the first light source is an area light source.

61.   (Previously Presented) The computer-readable medium of claim 48 wherein the first light source is a point light source.

62.   (Previously Presented) The system of claim 53 wherein the processing system is further configured to:

compress the first visibility function to generate a second visibility function;

store the second visibility function in a shadow map.

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63.   (Previously Presented) The system of claim 53 wherein the processing system is further configured to:

determine a first map plane associated with the first light source;

process information associated with the first map plane;

determine a first sample region on the first map plane;

wherein each of the first ray and the second ray intersects the first map plane within the first sample region.

64.   (Previously Presented) The system of claim 53 wherein the first light source is an area light source.

65.   (Previously Presented) The system of claim 53 wherein the first light source is a point light source.

66.   (Previously Presented) The computer-readable medium of claim 49 wherein the first geometric element is a surface element.

67.   (Previously Presented) The computer-readable medium of claim 49 wherein the first geometric element is a volumetric element.

68.   (Previously Presented) The system of claim 54 wherein the first geometric element is a surface element.

69.   (Previously Presented) The system of claim 54 wherein the first geometric element is a volumetric element.

70.   (Previously Presented) The computer-readable medium of claim 50, and further comprising:

one or more instructions for compressing the first visibility function to generate a second visibility function;

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one or more instructions for storing the second visibility function in a shadow map.

71.   (Previously Presented) The computer-readable medium of claim 50 wherein the first visibility function is associated with a plurality of values corresponding to a first location with respect to a first three-dimensional coordinate system, the first three-dimensional coordinate system associated with the first light source.

72.   (Previously Presented) The computer-readable medium of claim 50 wherein the first light source is an area light source.

73.   (Previously Presented) The computer-readable medium of claim 50 wherein the first light source is a point light source.

74.   (Previously Presented) The system of claim 55 wherein the processing system is further configured to:

compress the first visibility function to generate a second visibility function;
store the second visibility function in a shadow map.

75.   (Previously Presented) The system of claim 55 wherein the first visibility function is associated with a plurality of values corresponding to a first location with respect to a first three-dimensional coordinate system, the first three-dimensional coordinate system associated with the first light source.

76.   (Previously Presented) The system of claim 55 wherein the first light source is an area light source.

77.   (Previously Presented) The system of claim 55 wherein the first light source is a point light source.

78.   (Previously Presented) A storage medium comprising a representation of an image formed by the computer program product of claim 51.

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79.   (Previously Presented) A storage medium comprising a representation of an image formed by the system for rendering an object of claim 56.

80.   (Previously Presented) A storage medium comprising a representation of an image formed by the computer program product of claim 52.

81.   (Currently Amended) ~~The~~A storage medium comprising a representation of an image formed by the system for rendering an object of claim 57.